

**WHAT IS CLAIMED IS:**

1. An isolated sodium channel type III  $\alpha$  subunit (mNa<sub>v</sub>1.3  $\alpha$  subunit) polypeptide, wherein the polypeptide comprises the amino acid sequence of SEQ ID NO:2.
2. The polypeptide of claim 1, wherein the polypeptide essentially consists of the amino acid sequence of SEQ ID NO:2.
3. An isolated mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide comprising at least 10 contiguous amino acids of SEQ ID NO:2, wherein the polypeptide includes one or more of the following amino acids: isoleucine 289, proline 518, serine 728, serine 1355, asparagine 1909, threonine 1910, and valine 1921.
4. An isolated mNa<sub>v</sub>1.3  $\alpha$  subunit nucleic acid molecule that encodes the polypeptide of any of claims 1-3.
5. The nucleic acid molecule of claim 4, wherein the nucleic acid comprises the nucleotide sequence of SEQ ID NO:1.
6. The nucleic acid molecule of claim 5, wherein the nucleic acid molecule consists essentially of the nucleotide sequence of SEQ ID NO:1.
7. The nucleic acid molecule of claim 4, wherein the nucleic acid is an allele of the nucleic acid sequence of SEQ ID NO:1.
8. A fragment of the mNa<sub>v</sub>1.3  $\alpha$  subunit nucleic acid molecule of claim 4, wherein the fragment encodes one or more of the following amino acids: isoleucine 289, proline 518, serine 728, serine 1355, asparagine 1909, threonine 1910, and valine 1921.
9. An expression vector comprising the mNa<sub>v</sub>1.3  $\alpha$  subunit nucleic acid molecule of claim 4 operably linked to a promoter.
10. A host cell comprising the nucleic acid of claim 4.
11. An agent which preferentially binds to the mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide of claim 1.
12. An agent which binds selectively to the mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide of claim 1 and not to a sodium channel type I or type II  $\alpha$  subunit polypeptide.
13. The agent of claim 12, wherein the agent is a small molecule, a nucleic acid, or a protein.

14. The agent of claim 12, wherein the agent modulates a mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide activity.
15. The agent of claim 13, wherein the agent is an antibody or antigen-binding fragment thereof.
16. The agent of claim 15, wherein the antibody is a polyclonal antibody or monoclonal antibody.
17. A pharmaceutical composition comprising the agent of claim 12 and a pharmaceutically acceptable carrier.
18. A method for modulating a mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide activity in a cell, the method comprising:
  - providing a sodium channel comprising a mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide, wherein the mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide is according to any of claims 1-3;
  - contacting the channel with an amount of a mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide modulator effective to modulate an activity of the mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide.
19. The method of claim 18, wherein the modulator is a small molecule, a nucleic acid, or a protein.
20. A method for identifying an agent that modulates the activity of a mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide, the method comprising:
  - providing a first sodium channel comprising a mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide, wherein the a mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide is according to any of claims 1-3;
  - contacting the channel with a test compound; and
  - evaluating an activity of the sodium channel, wherein a change in activity relative to a reference value is an indication that the compound is an agent that modulates the channel.
21. The method of claim 20, wherein the test compound is a small molecule, a peptide, or a nucleic acid.
22. The method of claim 20, wherein the sodium channel is contained within a biological sample.
23. The method of claim 20, wherein the channel is contacted with multiple test compounds.

24. The method of claim 20, wherein the sample comprises a cell membrane.
25. The method of claim 24, wherein the sample comprises a cell.
26. The method of claim 25, wherein the cell is a eukaryotic cell.
27. The method of claim 26, wherein the cell is *Xenopus* oocyte.
28. The method of claim 26, wherein the cell is a mammalian cell.
29. The method of claim 20, wherein the activity comprises regulation of sodium concentration.
30. The method of claim 20, wherein the evaluating comprises detecting sodium flux.
31. The method of claim 20, wherein the contacting occurs under conditions which, in the absence of the test compound, cause a first amount of sodium flux.
32. The method of claim 20, wherein the evaluating comprises using a Na<sup>+</sup> flux assay.
33. The method of claim 20, wherein the assay uses patch clamp electrophysiology.
34. The method of claim 20, wherein the assay uses two electrode voltage clamp electrophysiology.
35. The method of claim 20, wherein the assay comprises using a sodium-sensitive dye.
36. The method of claim 20, wherein the assay is a high-throughput assay.
37. The method of claim 20, further comprising the steps of:
  - providing a second sodium channel comprising a mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide, wherein the mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide is other than a mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide according to claims 1-3;
  - contacting the second sodium channel with the test compound;
  - evaluating the activity of the second sodium channel.
38. The method of claim 37, further comprising comparing the activity of the first sodium channel in the presence of the test compound to the activity of the second sodium channel in the presence of the test compound.
39. The method of claim 37, wherein a plurality of sodium channels are provided.
40. The method of claim 20, wherein the mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide comprises the amino acid sequence of SEQ ID NO:2.
41. A method for identifying an agent useful in the treatment of a disorder related to sodium current modulation, the method comprising:
  - providing a sodium channel comprising a mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide

according to any of claims 1-3;

contacting the channel with a test compound; and

evaluating an activity of the channel, wherein a change in activity relative to a reference value is an indication that the test compound is an agent useful in a disorder related to sodium current.

42. The method of claim 41, wherein the disorder is pain, paraesthesia, stroke, head trauma, a neurodegenerative disorder, or a disorder related to hyperexcitability of neurons.
43. The method of claim 41, further comprising administering the compound in vivo.
44. The method of claim 41, further comprising modifying the compound for use in vivo.
45. The method of claim 41, further comprising evaluating modulation of a related human Na<sub>v</sub>1.3  $\alpha$  subunit polypeptide by the compound.
46. A method for treating a subject having a disorder related to sodium channel current, the method comprising:
  - identifying an agent that selectively binds a mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide, and
  - administering to a subject in need of such treatment a pharmacological agent which is selective for a sodium channel comprising a mNa<sub>v</sub>1.3  $\alpha$  subunit polypeptide.
47. The method of claim 46, wherein the disorder is pain, paraesthesia, stroke, head trauma, a neurodegenerative disorder, or a disorder related to hyperexcitability of neurons.